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ANATOMICAL DATA ON A RARE *HYPSELODORIS PICTA* (SCHULTZ, 1836) (GASTROPODA, DORIDACEA) FROM THE COAST OF BRAZIL WITH DESCRIPTION OF A NEW SUBSPECIES

J. S. Troncoso, F. J. Garcia and V. Urgorri

ABSTRACT

A rare specimen of the chromodorid doridacean *Hypselodoris picta* (Schultz, 1836), is described from the southeast coast of Brazil. The coloration of this specimen differs from the typical pattern of the species, mainly due to the presence of a white marginal notal band and dark blue gills without yellow lines on their rachis, as is typical in *H. picta*. Along with this, the morphology of the reproductive system and the radular teeth of this specimen differs from those of other *H. picta*. The results of a comparative analysis of *Hypselodoris picta* is presented in this paper, with description of a new subspecies.

As was stated by Gosliner (1990), the large species of Atlantic *Hypselodoris* Stimpson,1855, have been the subject of some taxonomical confusion. Ortea, et al. (1996) studied many specimens of *Hypselodoris* from diferent Atlantic and Mediterranean regions which allowed them to conclude that *H. webbi* (d'Orbigny, 1839) and *H. valenciennesi* (Cantraine, 1841) have to be considered as synonyms of *H. picta* (Schultz, 1836). *H. picta* is a known amphi-Atlantic species from Florida, Puerto Rico and Brazil (Marcus, 1977, cited as *H. sycilla*), Azores islands (Gosliner, 1990), Canary Islands (Bouchet and Ortea, 1980), the Atlantic coasts of France and Spain (Bouchet and Ortea, 1980; Cervera, et al. 1988) and the Mediterranean Sea (Thompson and Turner, 1983). It has a large variety in its body color patterns and in its radular morphology.

A rare specimen of *H. picta* was collected on the southeast coast of Brazil, which differs in coloration and anatomy from other descriptions of this species. These differences allow us to conclude that our specimen constitutes a new subspecies.

Hypselodoris picta lajensis new subspecies
(Figs. 1–5)

Material.—The only specimen collected was found at 25 m in depth over rock with ascidians, hydroids and sponges, on the southeast coast of Brazil in Laje de Santos, off shore from Santos Bay (São Paulo State), between coordinates 24°19′00″–24°20′00″S and 46°10′00″–46°12′00″W. It is considered a holotype and deposited in the Museu Oceanográfico "Prof. Eliézer de Carvalho Rios" from the Foundation University of Rio Grande, in Rio Grande, Brazil, with code number 33640.

External Anatomy.—Living animal reaches 30 mm in length and 9 mm in breadth. Body narrow and elongate, with dorsal surface of notum slightly wrinkled (Fig. 1 and 2). In motion edges of notum with scalloped appearance. Anterior edge of cephalic region with deep central indentation. Rhinophores with 17 perfolations. Nine unipinnate gills arranged in circle around anus, and encircled by sheath. Short and digitiform oral tentacle on each side of mouth. Foot with two short, curved pedal tentacles, anterior border transversally furrowed.

Genital pore lies on right anterior third of body (Fig. 2).

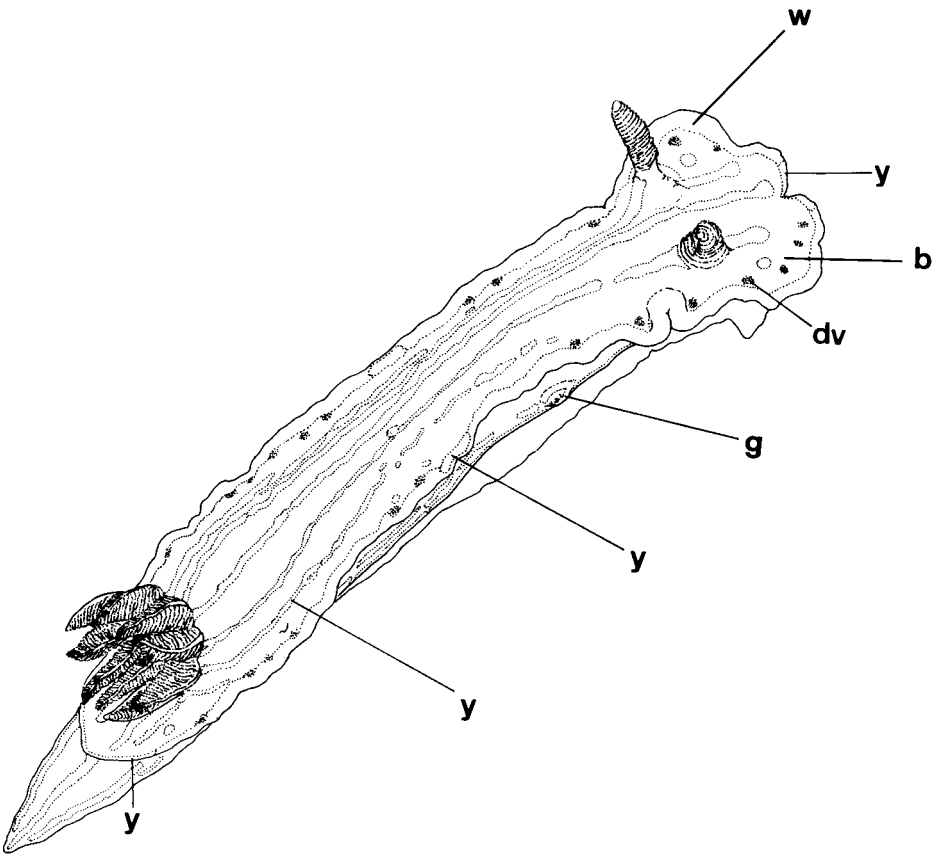

Figure 1. *Hypselodoris picta lajensis.* Dorsal view of the living animal: b = blue-violet; g = gonopore; w = white; y = yellow.

Coloration.—Nine and 10 white spherical dermal glands, respectively, in notal margin on left and right side of rhinophores, and 6 in rear region of notum.

Ground color of body blue-violet, rhinophores darker than body surface (Figs. 1,2). On outer and inner surface of branchial rachis coloration darker than perfolations. Translucent periocular area lies behind each rhinophore. White marginal band surrounds both dorsal and ventral edge of notum. In central cephalic fold and on centre of body, marginal band partially covered by yellow segment. Five fine yellow lines run longitudinally over back, from head to branchial pocket and continue along anterior and posterior edge, and continue backward to end of notum. In cephalic region, each line enlarges as yellow spot. Central line runs without interruption its whole length; both lateral lines broken at level of rhinophoral base, partially surrounding base, lines coincide with periocular area, being lighter or interrupted. Marginal lines broken along their length, like several elongated spots. Circular spot appears at their anterior end. Several dark violet-blue spots scattered and surround marginal white band. Lateral sides of body blue-violet, with 4 or 5 interrupted yellow lines. One yellow line encircles gonopore. Oral tentacles dark blue-violet. Tail has central and two lateral yellow lines, ventral surface of foot light blue-violet with light yellow line along dorsal lip (Fig. 3).

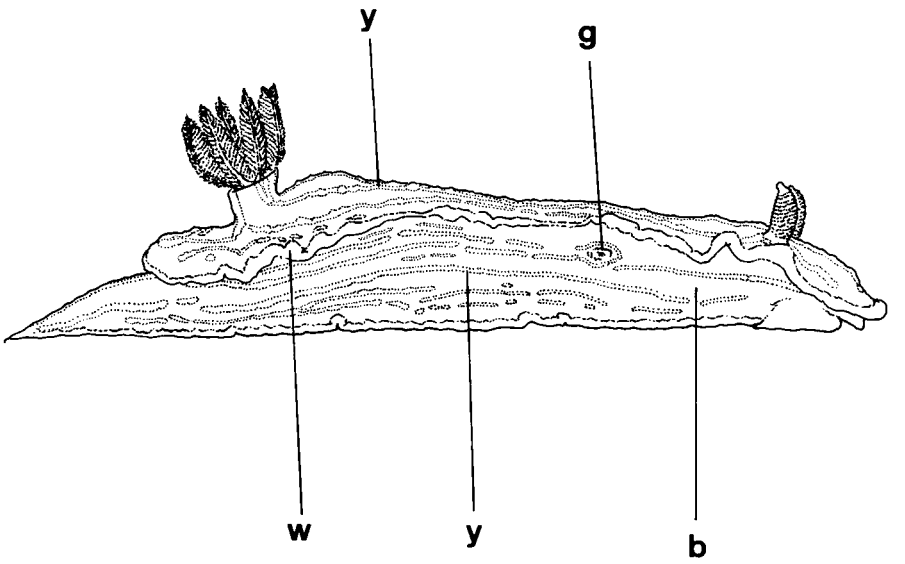

Figure 2. *Hypselodoris picta lajensis.* Lateral view of the living animal: b = blue-violet; g = gonopore; w = white; y = yellow.

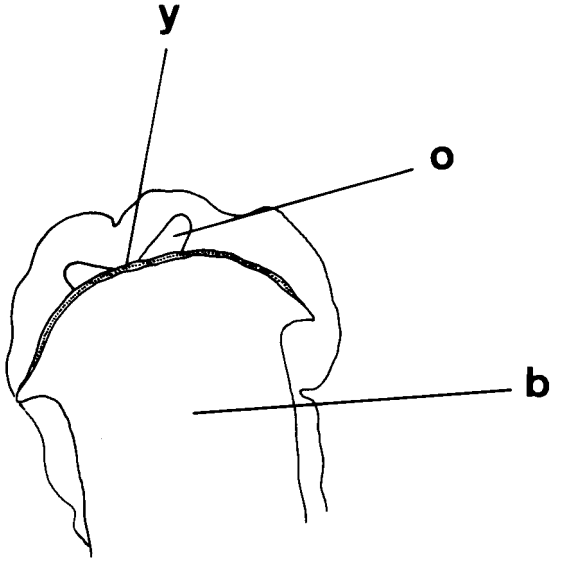

Figure 3. *Hypselodoris picta lajensis.* Ventral view of the cephalic region: b = blue-violet; o = oral tentacle; y = yellow.

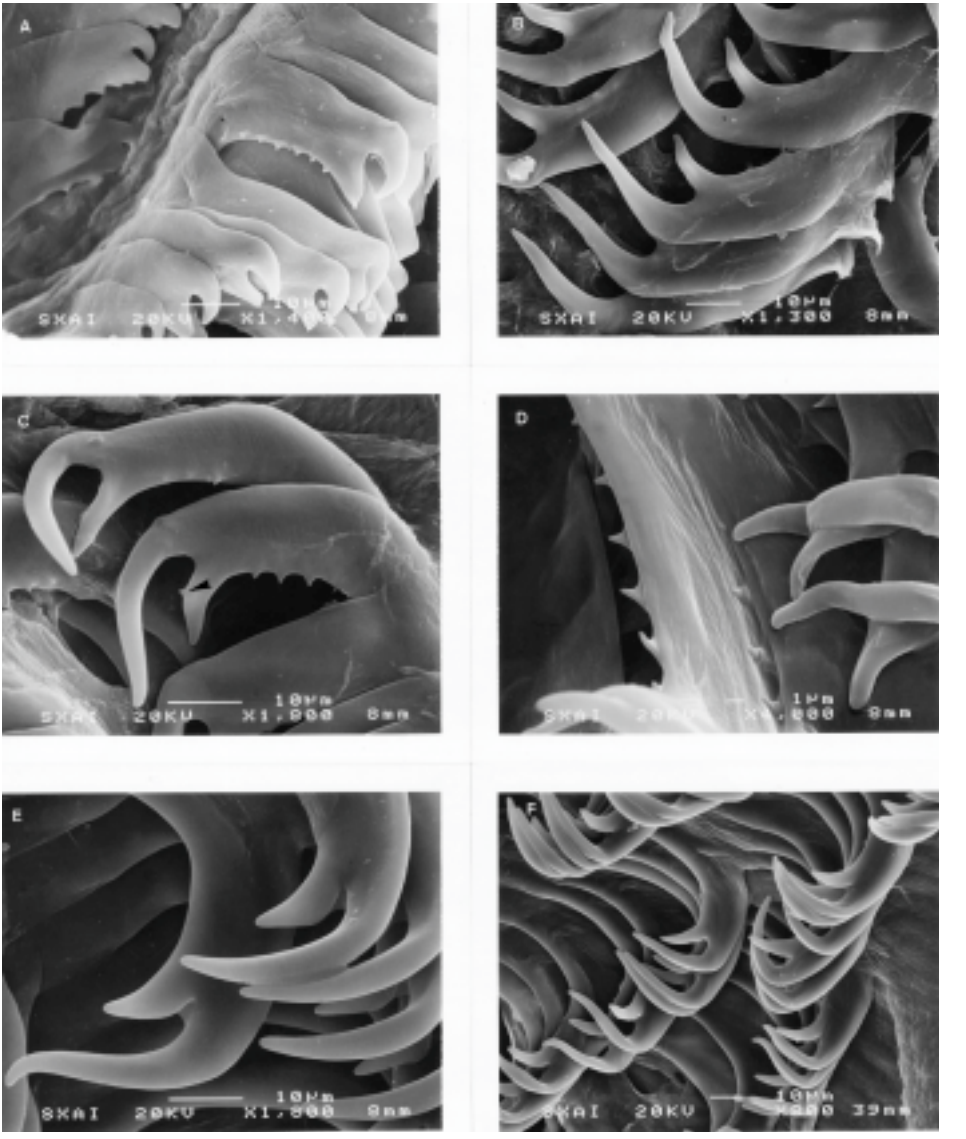

Figure 4. *Hypselodoris picta lajensis.* Radular teeth: A, outermost lateral teeth; B, teeth from middle of half row; C, arrow indicates the small denticle on the inner cusp; D, detail of the triangular small denticles; E and F, mid-lateral teeth.

Internal Anatomy.—Radular formula 49 × 117.0.117, rachidian tooth absent (Fig. 4). All teeth bicuspid. Inner teeth have long cusps, outer cusp longer than inner, although on innermost teeth both cusps are almost same length. Cusps appear more or less recurved toward apex. Inner side of teeth bear 2–6 triangular small denticles, and sometimes another denticle on inner cusp. Outermost teeth blunt, cusps shorter with 3–6 denticles on inner side, size decreases toward marginal side.

Reproductive system (Fig. 5).—Preampullary duct enlarges into thick curved ampulla. Distal end of ampulla narrows and bifurcates into short oviduct, which enters female

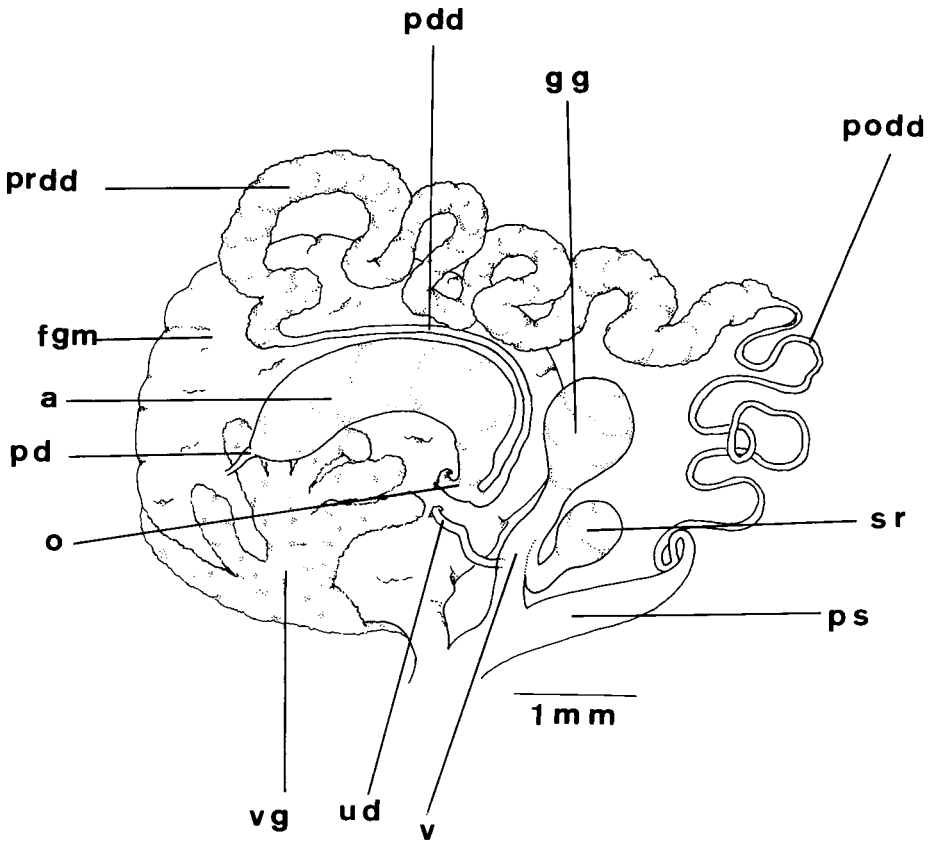

Figure 5. *Hypselodoris picta lajensis.* Reproductive system: a = ampulla; fgm = female glandular mass; gg = gametolytic gland; pd = preampullar duct; pdd = prostatic deferent duct; podd = postprostatic defernt duct; prdd = preprostatic deferent duct; ps = penial sheath; sr = seminal receptacle; ud = uterine duct; v = vagina; vg = vestibular gland.

gland mass, and long deferent duct. Deferent duct differentiates into three regions: preprostatic narrow portion, lying along the ampulla; long and coiled prostatic portion; and long narrow and coiled postprostatic portion, which connects the penial sac. Gametolytic gland, small and spherical, opens at end of vagina. Seminal receptacle, smaller than gametolytic gland and almost spherical, at end of short curved duct attached to vagina. Because of transparency visible duct continues into vagina towards gametolytic gland. Narrow uterine duct emerges from vagina and enters female gland mass. Vagina joins gonopore to penial sac, opening into short common atrium. Digitate vestibular gland present on surface of female gland.

Etymology.—The subspecies has been named *Hypselodoris picta lajensis* in honor of Laje de Santos, its type locality.

Table 1. Comparison of characters used to differentiate the six subspecies of *Hypselodoris picta*, based on Edmunds, 1981; Ortea et al., 1996 and our observations.

	H. picta picta (Schultz, 1836)	*H. p. webbi* d' Orbigny, 1839	*H. p. azorica* Ortea, Valdés and García-Gómez, 1996	*H. p. tema* Edmunds, 1981	*H. p. verdensis* Ortea, Valdés and García-Gómez, 1996	*H. p. lajensis*
General color	pale blue violet	dark blue	dark blue	dark gretish green, violet in central region	dark green	blue-violet
Marginal band of the notum	white in young specimens, yellow in adults	white in young specimens, yellow in adults	?	white or pale grey band, interrupted anterior, posterior and in the middle of the body, where the color is dark blue-violet	?	white, partially covered by anterior, lateral and posterior yellow segments
Dorsal band of the notum	young specimens with 3 bands, in adults the bands are broken and its number increases	elongated or circular yellow spots	thick yellow or orange spots not in lines	1 central broken orange band and lateral irregular orange bands	many orange spots and lines	5 yellow bands; the marginal bands are broken
Branquial rachis	yellow	yellow	yellow	yellow	yellow	dark blue-violet
Dark spots surrounding the notum	dark blue in young specimens; absent in adults	dark blue in young specimens; absent in adults	absent	absent	?	dark blue-violet
Lateral radular teeth denticulated	present	present	absent	absent	first lateral tooth denticulated	present
Postprostatic deferent duct	short	short	short	short	short	long
Preprostatic deferent duct	not differentiated	not differentiated	not differentiated	not differentiated	not differentiated	differentiated and long
Geographical distribution	Amphi-Atlantic species (see Introduction)	Florida to Brazil; South of Spain to Canary Islands	Azores Islands	Ghana	Cabo Verde, São Tomé; South of Angola	Santos, São Paulo, Brazil

Discussion

Hypselodoris picta is varied in coloration and anatomical aspects. Thus, its color pattern is described mainly as having a blue ground color with a yellow notal margin; the notum, the side of the body and dorsal surface of the foot are ornamented with yellow spots. However, Bouchet and Ortea (1980) and Ortea, et al. (1996) described small specimens with three longitudinal and dorsal yellow lines, one in the middle line of the notum and two lateral lines. In large specimens these lines are broken; more or less elongated spots appear over the entire notum. Our specimen coincides with those described by Bouchet and Ortea (1980) and Ortea, et al. (1996) by the presence of longitudinal lines, although it differs in number (five on our animal) and because the rhinophoral sheaths are not encircled by yellow lines. Along with this, the coloration of our specimen is distinguished from other *H. picta* due to the gills lacking a yellow line at their rachis.

Thompson and Turner (1983) described a specimen of *H. picta* (cited as *H. webbi*) from the Aegean Sea, is similar to our animal. Ours has the white marginal band with yellow zones, although in their specimen a yellow segment was at the extreme end of the notum; on the notum there are three interrupted yellow lines with numerous irregular spots everywhere, the gills have yellow lines along the outer rachis and there are dark blue patches at the end of the tail and the tip of the oral tentacles.

The reproductive system of our specimen differs from those described by Ortea et al. (1996) by the presence of a differentiated long and narrow preprostatic deferent duct and a long postprostatic deferent duct. The reproductive system described by Ortea et al. (1996) lacks a differentiated preprostatic duct and the posprostatic region is short. In relation to the radula there are also some exceptions. Gosliner (1990) described the radula of *H. picta* (cited as *H. webbi*) Açores Islands as having lateral teeth with a bifid cusp, without any secondary denticles, although vestiges of denticles can appear as faint tubercles below the lower cusp and marginal teeth, with the cusps reduced or entirely absent. Ortea et al. (1996) described the lateral teeth of several specimens with 0–4 denticles on the inner side and Bouchet and Ortea (1980) described the marginal teeth with the outer cusp denticulate. In our specimen the lateral teeth bear 2–6 triangular denticles, sometimes with a small denticle on the inner cusp and the marginal teeth, although their size decreases toward the marginal side, both cusps are well differentiate and 3–6 denticles on their inner side are present.

The location of dermal glands (named MDFs, after García-Gómez, et al. 1990) in our specimen coincides with those described by García-Gómez et al. (1990) for *H. webbi* from Southern Spain, with MDFs in the cephalic region, at both sides of the rhinophores and the rear region of the notum. However, Ortea, et al. (1996) describe the species as having MDFs all around the notal margin excepting the middle region of the body, those situated at the cephalic, lateral and branchial regions being the biggest.

A more similar coloration pattern of our animal is present in *H. ruthae* Marcus and Hughes, 1974, from Barbados and the Caribbean Panamanian coast (Marcus and Hughes, 1974; Meyer, 1977; Marcus, 1977). This species is blue-blackish with five fine yellow longitudinal lines on the notum; the notal margins are white, interrupted in the middle of the body, where they are dark blue. However, this species differs from our specimen by the presence of a white marginal band covered by yellow coloration anteriorly as well as in the middle of the body; the rhinophoral tips of *H. ruthae* are white, the dorsal yellow lines connect themselves in front of the rhinophores like a peripheral line, their gills are

fawn with a dark-blue line along the rachis and the radula of *H. ruthae* has noticeably fewer teeth on each row (according to Marcus and Hughes, 1974, its radular formula is 53 × 60.0.60; Ortea et al. (1996), described a radula with the formula 36–45 × 30–45.0.35–45). Besides this, *H. ruthae* has 5–10 orange-yellow notal glands under the hind end of the notal border and 1–4 at both sides of the rhinophores (6 and 9–10, respectively, in our animal). The reproductive system of *H. ruthae* described by Ortea et al (1996)has a very large vestibular gland and a short prostatic portion of the deferent duct without a differentiated preprostatic region.

Due to the great variability of the color pattern and radula features and the wide geographical distribution, Ortea et al (1996) defined five subspecies, which are compared to our specimen in Table 1. These features allow us to conclude that our specimen constitutes a new taxon. Nevertheless, as it coincides with *H. picta* in several characteristics and this species has a notable variability, we prefer, at least until other specimens are collected and a more detailed study could be done, to consider our animal as a new subspecies of *H. picta*. With regard to the distribution of *H. picta* (see introduction), the finding of our specimen in Laje de Santos (off shore from Santos Bay), constitutes the most southern record of this species.

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ADDRESS: (J.S.T.) *Area de Biología Animal; Facultad de Ciencias del Mar; Universidad de Vigo; 36200 Lagoas-Marcosende; Vigo; Spain. e-mail: troncoso@uvigo.es;* (F.J.G.) *Laboratorio de Biología Marina; Facultad de Biología; Avda. Reina Mercedes, 6; Apdo. 1095; 41080 Sevilla; Spain. e-mail: fjgarcia@cica.es;* (V.U.) *Departamento de Bioloxía Animal; Facultade de Bioloxía; Universidade de Santiago de Compostela; 15706 Santiago de Compostela; Spain. e-mail: bavituco@usc.es.*